

WHAT IS CLAIMED IS:

1           1.    An apparatus supporting both battery identification  
2    and communications over an interface between a battery and  
3    an electronic device, comprising:

4                a first circuitry within the electronic device  
5    capable of communicating with the battery;

6                means for identifying a type of the battery  
7    connected to the electronic device; and

8                means enabling communications between the first  
9    circuitry and communications circuitry within the battery.

1           2.    The apparatus of Claim 1, wherein the communication  
2    between the first circuitry and the communications circuitry  
3    comprises serial communications.

1           3.    The apparatus of Claim 2, wherein the serial  
2    communications comprise half duplex, asynchronous  
3    communications.

1           4.    The apparatus of Claim 2, wherein the means for  
2    enabling communications, comprises:

3           a transceiver for transmitting and receiving serial  
4   communications between the electronic device and the  
5   communications circuitry of the battery;

6           first means for holding data to be transmitted by  
7   the transceiver; and

8           second means for holding data received by the  
9   transceiver.

1           5.   The apparatus of Claim 4, wherein the transceiver  
2   comprises a universal asynchronous transmitter receiver.

1           6.   The apparatus of Claim 4, wherein the first and  
2   second means for holding comprise data registers.

1           7.   The apparatus of Claim 1 wherein a bit rate between  
2   the processor and communications circuitry of the battery  
3   is no greater than 1200 baud.

1           8.    The apparatus of Claim 1, wherein the means for  
2   determining comprises means for determining at least one of  
3   a resistance or capacitance located in the battery, the  
4   resistance identifying the type of the battery.

1           9.    The apparatus of Claim 8, wherein the means for  
2   determining comprises:  
3                a resistor connected within the electronic device;  
4   and  
5                means associated with the processor for calculating  
6   a resistance in the battery pack in response to a resistance  
7   value of the resistor connected within the electronic device  
8   and a voltage drop across the resistor.

1           10.   The apparatus of Claim 8, wherein the means for  
2   determining comprises:  
3                a capacitor connected within the electronic device;  
4   and  
5                means associated with the processor for calculating  
6   a capacitance in the battery pack in response to a

7 capacitance value of the resistor connected within the  
8 electronic device and a voltage drop across the capacitor.

1 11. The apparatus of Claim 8, wherein the means for  
2 determining comprises:

3 a current source within the electronic device for  
4 generating a current; and

5 means associated with the processor for calculating  
6 the resistance in the battery in response to current provided  
7 by the current source and a voltage level at a communication  
8 pin interface.

1 12. The apparatus of Claim 1, wherein the battery  
2 includes:

3 a first memory for storing a representation of a  
4 total capacity of the battery pack; and

5 a second memory for storing a representation of the  
6 current capacity of the battery, such that means associated  
7 with the electronic device may calculate the present charge  
8 level of the battery in response to the representations in  
9 the first and second memories.

1           13. A method enabling both battery identification and  
2   serial communication over an interface between a battery and  
3   an electronic device, comprising:

4                 measuring an impedance between a communications pin  
5   and a ground pin within a battery in response to an active  
6   connection between the battery and the electronic device; and  
7                 determining whether the battery has communications  
8   capabilities and a type of the battery based on the measured  
9   impedance.

1           14. The method of Claim 13 further including the step  
2   of enabling communications between the electronic device and  
3   the battery upon determining that the battery has  
4   communications capabilities.

1           15. The method of Claim 14 wherein the step of enabling  
2   communications further comprises the steps of:  
3               placing data to be transmitted to the battery into  
4   a first data register;  
5               transmitting the data in the first data register  
6   to the battery via the communications pin;  
7               receiving data from the battery via the  
8   communications pin;  
9               placing the received data from the battery into a  
10   second data register; and  
11              reading the received data within the second data  
12   register.

1           16. The method of Claim 13 wherein the step of  
2 measuring further includes the steps of:

3                 selectively switching a resistance between system  
4 voltage and the communications pin;

5                 determining the impedance in response to a value  
6 of the resistance between system voltage and the single  
7 communication pin, a voltage level at the communications pin  
8 and the system voltage level.

1           17. The method of Claim 13 wherein the step of  
2 measuring further comprises the steps of:

3                 selective switching a current source between system  
4 voltage and the communications pin;

5                 determining the impedance in response to a current  
6 supplied by the current source and the voltage level at the  
7 communications pin.

1           18. A battery comprising;  
2               means for providing a power source to a connected  
3 electronic device;  
4               a first memory for storing a representation of a  
5 total capacity of the battery; and  
6               a second memory for storing a representation of the  
7 current capacity of the battery, wherein upon connection of  
8 the electronic device present charge level of the battery may  
9 be determined from the first and the second memories.

1           19. The battery of Claim 18 wherein the representation  
2 of the total capacity of the battery is coded as a selected  
3 number of charge units representing a fully charged battery.

1           20. The battery of Claim 19 wherein the representation  
2 of the current capacity comprises a number of charge units  
3 no greater than the selected number of charge units  
4 representing a fully charged battery.

1           21. The battery of Claim 20 wherein the number of  
2 charge units representing the current capacity are



1     periodically decreased based upon charge usage of the battery  
2     by the electronic device.

1           22. The battery of Claim 20 wherein the number of  
2     charge units representing the current capacity are  
3     periodically increased based upon charging of the battery by  
4     an external power source.

1           23. The battery of Claim 20 wherein the charge unit  
2     represents a selected amount of current.

1           24. A battery comprising:  
2               means for providing a power source to a connected  
3 electronic device;  
4               a first memory for storing a selected number of  
5 charge units representing a fully charged battery;  
6               a second memory for storing a number of charge  
7 units no greater than the selected number for a fully charged  
8 battery representing a current charge of the battery, wherein  
9 upon connection of the electronic device the number of charge  
10 units in the second memory are periodically updated based  
11 upon current usage levels of an attached electronic device  
12 and a present charge level of the battery may be determined  
13 from the first and the second memory.

1           25. The battery of Claim 24 wherein the number of  
2 charge units representing the current capacity are  
3 periodically decreased based upon charge usage of the battery  
4 by the electronic device.

1           26. The battery of Claim 24 wherein the number of  
2 charge units representing the current capacity are

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1     periodically increased based upon charging of the battery by  
2     an external power source.

1             27. The battery of Claim 24 wherein the charge unit  
2     represents a selected amount of current.